

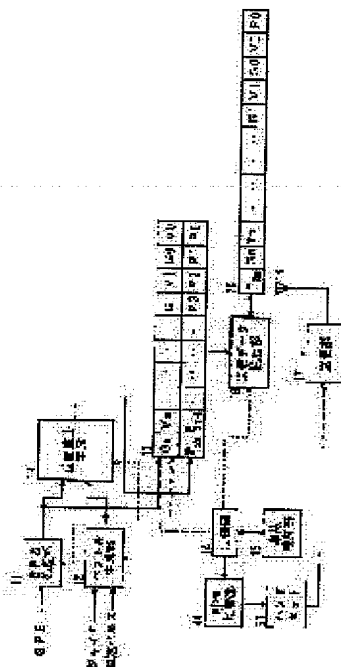
(11)Publication number : 11-283158  
(43)Date of publication of application : 15.10.1999

G08B 25/08  
G01S 5/14  
G08B 25/04  
// B62D 41/00

The cited document  
No. 2

(72)Inventor : WADA KAZUNARI  
YAMADA HISANORI  
MAEDA HIROYUKI  
IWAMATSU HIROSHI  
NEGISHI TATSUYUKI  
ICHIKAWA YUKIO

**SOLUTION:** An emergency vehicle report device loaded on a vehicle to automatically transmit data for specifying the position of the vehicle through a radio line to a center when an accident occurs is provided with a data storage means 13 for cyclically storing data concerning the position of the vehicle during traveling, a data reading means 16 for reading the data stored in the data storage means by dividing them into plural blocks when the accident occurs, a calling means 61 for performing voice speaking and control means 14 and 44 for alternately performing the transmission of blocks read by the data reading means and the voice speaking by means of the calling means 61. Thus, the position and condition of the accident can be efficiently reported to the center.



## CLAIMS

## [Claim(s)]

[Claim 1] In a vehicle emergency reporting system with which data for pinpointing a vehicle position in the center via a wireless circuit from an accident vehicle is automatically transmitted at the time of an accident occurrence, Vehicles record data about a vehicle position cyclically during a run, and said data currently recorded is divided into two or more blocks at the time of an accident occurrence, A vehicle emergency reporting system having divided each block, having transmitted to a center and enabling a telephone call with a center between transmission of each block.

[Claim 2] The vehicle emergency reporting system according to claim 1 transmitting said block to a center sequentially from a block containing data with a high priority.

[Claim 3] A vehicles emergency call unit comprising:

A data storage means which records data about a vehicle position cyclically during vehicle running in a vehicles emergency call unit which transmits data for being carried in vehicles and pinpointing a vehicle position via a wireless circuit at the time of an accident occurrence automatically in the center.

A data reading means which divides into two or more blocks data currently recorded on said data storage means at the time of an accident occurrence, and reads it.

A call means which performs a voice call.

A control means to which transmission of a block read by said data reading means and a voice call by said call means are made to carry out by turns.

[Claim 4] The vehicles emergency call unit according to claim 3, wherein said data reading means reads from said block containing data in which a record stage is newer than said data storage means previously.

[Claim 5] In a vehicle emergency reporting system with which data for pinpointing a vehicle position in the center via a wireless circuit from an accident vehicle is automatically transmitted at the time of an accident occurrence, Vehicles record cyclically vector data showing movement of GPS data and vehicles which were acquired from a GPS Satellite during a run, A vehicle emergency reporting system setting up said range so that one or more effective GPS data may be included while a record stage chooses data of a new prescribed range from said data currently recorded at the time of an accident occurrence and transmitting to a center.

[Claim 6] The vehicle emergency reporting system according to claim 5 compounding plurality of said vector data and controlling increase of a transmitted data amount when a transmitted data amount increases by expansion of said range.

[Claim 7] A vehicles emergency call unit which transmits automatically data for being carried in vehicles and pinpointing a vehicle position via a wireless circuit at the time of an accident occurrence which is provided with the following, and in which said data reading means is characterized by setting up said range so that one or more effective GPS data may be included in the center.

A data storage means which records cyclically vector data showing movement of GPS data and vehicles which were acquired from a GPS Satellite during vehicle running.

A data reading means which chooses and reads data of a prescribed range where a record stage is new out of said GPS data and vector data which are recorded on said data storage means at the time of an accident occurrence.

A transmitting means which transmits data read by said data reading means to a center.

[Claim 8] The vehicles emergency call unit according to claim 7, wherein said data reading means compounds plurality of said vector data and aims at reduction of a transmitted data amount.

[Claim 9] In a vehicle emergency reporting system with which data for pinpointing a vehicle position in the center via a wireless circuit from an accident vehicle is automatically transmitted at the time of an accident occurrence, When it detects that vehicles transmitted to a center said data which records data about a vehicle position cyclically and is recorded during a run at the time of an accident occurrence, and moved further after said transmission, A vehicle emergency reporting system broadcasting again data which pinpoints a position after movement to a center.

## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is especially told an accident position and an accident condition exactly by the center about the vehicle emergency reporting system which carries out the automatic announcement of the vehicle position to a center through radio from an accident vehicle, and the vehicles emergency call unit which performs this report.

[0002]

[Description of the Prior Art] In recent years, in our country, in order to cope with the traffic accident which occur frequently, there is a motion which is going to standardize a vehicle emergency reporting system. This system is automatic from the emergency call unit carried in vehicles, notifies vehicles emergency intelligence to a center, shortens time until an emergency vehicle arrives at an accident site, and a wounded person is rescued and it enables it to relieve him more nearly promptly at the time of a collision and accident occurrence of vehicles.

This system is already contained in the execution phase in Germany.

[0003] The following functions are needed for the emergency call unit carried in vehicles.

(1) Communication function (communication with a center)

It has the same communication function as a portable telephone, and the automatic switchover of 9600-bps data communications and a voice call is made possible.

(2) Position detecting function (detecting position of self-vehicles)

As data for vehicle position detection, self-vehicle position data, such as GPS and a gyroscope, is recorded.

(3) Urgent detection function (urgent detection of self-vehicles)

It has a crash sensor and a sideslip sensor and detects what kind of accident occurred.

(4) Vehicles emergency intelligence report function (emergency dial in the center)

An emergency dial is started by detection of a crash sensor or a sideslip sensor, and the automatic transmission of the recorded self-vehicle position data is performed. The manual report by the depression of a vehicles emergency intelligence notification button is also enabled.

(5) Power management function (the power supply of an emergency call unit is controlled)

At the time of accident detection, the automatic change to an auxiliary battery is performed and the power supply between emergency dials is secured.

[0004] If the vehicles carrying this emergency call unit encounter an accident, it is automatically transmitted by the center, and in a center, the self-vehicle position data currently recorded on the emergency call unit will check the position of an accident vehicle based on this data, and will demand mobilization of an emergency vehicle.

[0005] From the former, giving the position-report function at the time of an accident occurrence to the navigation device which displays the traveling position of vehicles like this emergency call unit is proposed, for example, that device is indicated by JP,5-5626,A etc.

[0006] However, in a vehicle emergency reporting system, unlike the navigation device which has a report function, databases, such as map data, are kept and managed by the center side, and the position of an accident vehicle is pinpointed by the center side based on the data sent from an accident vehicle using this database.

[0007] In this case, pinpointing of the accident position in a center must be performed promptly and correctly, in order to put rescue of the injured into execution immediately. The data transmission times from an accident vehicle to a center will be about 30 seconds substantially, if time to spend on network connection is removed. In the meantime, the data which enables pinpointing of an accident position must be transmitted to a center.

[0008] In the group including the artificer of this invention, etc., the vehicle emergency reporting system which can respond to such a request is proposed. First, this system is explained.

[0009] In this system, as shown in drawing 6, the emergency call unit 41 possessing various kinds of sensors and means of communication is carried in vehicles, and data is transmitted to the center 81 via the wireless circuit 89 and the telephone line 88 from this emergency call unit 41 at the time of an accident occurrence.

[0010] The angle sensors 47, such as a gyroscope with which the emergency call unit 41 detects the running direction of vehicles, GPS receiver 48 which positions a self-vehicle position from the GPS data received with the GPS antenna 65, The sideslip sensor 49 which detects the sideslip of vehicles, and RAM50 which record the self-vehicle position data under run, etc., Flash ROM 51 which saves everlastingly data required for a break through of an accident cause, CPU46 which detects the occurrence of an accident based on the information

from the speed sensor 54 linked to the emergency call unit 41, the reverse 55, the crash sensor 56, the brake 57, etc., or the information from the sideslip sensor 49, and controls operation of an automatic announcement, The modem 45 which carries out the strange recovery of the data transmitted and received, and the control switching part 44 which controls the change to data communications or voice communication, The data / voice switching part 43 which changes the input and output point of the data transmitted and received or a sound, It has the cellular phone 42 which performs communication operation through the antenna 64, and the internal battery 52 which supplies electric power when the external battery 53 used at the time of usual cannot use it for an emergency etc., The loudspeaker 62 and the microphone 63 which make voice communication in handsfree possible, and the emergency button 60 which enables the emergency dial in hand control, It has connected with LED59 etc. which displays the operating state of the emergency call unit 41.

[0011]The telephone 82 by which the center 81 performs communication operation on the other hand, and the modem 83 which carries out the strange recovery of the data transmitted and received, An accident position is judged to be the map data 85 accumulated in the database, or it has CPU84 which controls each part, the final controlling element 87 which an operator operates, and the indicator 86 as which the accident position on a map, etc. are displayed.

[0012]In this system, if the vehicles under run record self-vehicle position data on RAM50 of the emergency call unit 41 one by one and an accident occurs, the self-vehicle position data in which the run history currently recorded is shown will be transmitted to the center 81. In the center 81, map matching is performed using the received data and an accident position is pinpointed.

[0013]The functional block of the emergency call unit 41 which performs record and transmission of this self-vehicle position data is shown in drawing 7. The GPS treating part 11 which this device processes the input signal from a GPS Satellite, and generates GPS data (G), The vector generation part 12 which computes motion vector (V) of vehicles from the vehicle speed pulse which shows the gyroscope data and the vehicle speed which show a direction, The position calculation means 19 which asks for a current position (P) using vector data (V) outputted from the GPS data (G) outputted from the GPS treating part 11, and the vector generation part 12, The ring buffer 13 which memorizes GPS-data (G) and vector data (V) and present position data (P), The send data reading section 16 which reads the data which should be transmitted from the ring buffer 13 at the time of an accident occurrence, The field 20 for send data used as temporary storage of the read send data, It has the transmission section 17 which transmits the read data to a center via the antenna 18, the accident detection part 15 which detects the occurrence of an accident, and the control section 14 which controls operation of the GPS treating part 11, the vector generation part 12, the position calculation means 19, and the send data reading section 16.

[0014]In these vehicles, it is received by the electric wave from a GPS Satellite at the time of the usual run, and the GPS treating part 11 of an emergency call unit, This input signal is processed and regenerative data, such as time, an orbital element, etc. which are sent from a GPS Satellite, or the lat/long data computed based on it is outputted to the ring buffer 13 and the position calculation means 19 for every fixed time.

[0015]During a run, from the data in which the direction inputted from a gyro device is shown, and the vehicle speed for which it asked from the vehicle speed pulse, the vector generation part 12 of an emergency call unit calculates the vector showing the move direction and speed of vehicles for every fixed time, and outputs it to the ring buffer 13 and the position calculation means 19.

[0016]Using the vector data inputted from the GPS data inputted from the GPS treating part 11, and the vector generation part 12, the position calculation means 19 adds required amendment, asks for a current position, and outputs present position data to the ring buffer 13.

[0017]If the data to input is cyclically written in the ring buffer 13 one by one and the writing of data goes around, the newly inputted data will be overwritten on the data recorded before a round. Therefore, only the data [ it goes back for a fixed period from the present time ] of a between will always be memorized by the ring buffer 13.

[0018]At drawing 7, the data currently recorded on the ring buffer 13 is expressed with Gm, Vm, --, G1, V1, G0, V0 and P2 m P 2-m-1, --, P0. Among this, they are G0, G1, --, the GPS data that were outputted from the GPS treating part 11 as for Gm (G0 is the oldest and Gm is the newest), It is V0, V1, --, the vector data that was outputted from the vector generation part 12 as for Vm (V0 is the oldest and Vm is the newest), and P0 (P0 is the oldest and P2m is the newest) is P2 m P 2-m-1, --, the present position data outputted from the position calculation means 19. Here, the case where vector data and GPS data are outputted by turns from the GPS treating part 11 and the vector generation part 12, and present position data is outputted from the position calculation means 19 at each output stage of vector data and GPS data is illustrated. When the repeat times of vector data and GPS data differ, the number of V data and G data which are held by the ring buffer 13 is different.

[0019]If an accident occurs on vehicles, the accident detection part 15 which comprises a crash sensor, a sideslip sensor, etc. will detect an accident from a shock, inclination of the body, etc. which are added to vehicles, and will tell it to the control section 14. In response, the control section 14 stops the output to the ring buffer 13 of data to the GPS treating part 11, the vector generation part 12, and the position calculation means 19, and orders it read-out of the data from the ring buffer 13 to the send data reading section 16.

[0020]The send data reading section 16 out of the data held at the ring buffer 13. Newest present position data (P2m), oldest present position data (P0), all the GPS data, and vector data are read to the field 20 for send data, and these data is outputted to the transmission section 17 in the following order.

[0021]the beginning -- the newest present position data -- ranking second -- GPS data and vector data -- the present position data oldest finally sequentially from what has a new record stage. That is, it becomes the order of P2m, Gm, Vm, --, G1, V1, G0, V0, and P0. The transmission section 17 transmits this data to that order in the center via the antenna 18.

[0022]Even when transmission is interrupted in the middle of data communications by transmitting data in such turn, the data (getting it blocked data of an accident position) of the newest self-vehicle position and the data in which the run history near it is shown will reach a center.

[0023]The data transmitted to a center from an emergency call unit is typically shown in drawing 8 (a). Data is transmitted to a center from an emergency call unit in order of the present position data P2m of the final point 24, Gm, Vm, Gm-1, Vm-1, --, Gk, Vk--, and the present position data P0 of G1, V1, G0, V0, and the point 22. Even when transmission stops immediately after transmitting Vk in the middle of this transmission, as shown in drawing 8 (b), in the center, the data of the present position data P2m of the point 24, Gm, Vm, Gm-1, Vm-1, --, Gk, and Vk can be obtained.

[0024]In a center, if the data which expresses a running locus from an emergency call unit is received, map matching with map data will be performed using it, and the final point 24 will be become final and conclusive.

[0025]When carried out without interrupting the data communications from an emergency call unit, in a center, map matching is performed as a position which begins the point 22 of drawing 8 (a) expressed with the present position data P0.

[0026]Although some methods are known by map matching, it is the processing which, in short, investigates correspondence with map data and the measured self-vehicle position data in series, and becomes final and conclusive the final position on map data.

[0027]For example, as shown in drawing 9, the road (thick line) which enters in the circle of a fixed radius from the point 22 expressed with the position data P0 on a map data base is searched for. The road extended in the almost same direction as the motion vector V0 is chosen from the inside, the adjacent positions 33, 34, and 35 from the point 22 on the road are pinpointed, and the dignity according to the distance (difference) from the point 22 is attached to the positions 33, 34, and 35.

[0028]Subsequently, it asks for the difference of each positions 33 and 34, the position which only the part of 35 lost-motion vector V0 moved, and the position (the 2nd adjacent position) on each road which approaches there, and accumulation of the dignity according to difference is carried out for every road. Next, it asks for the difference of the position which only the part of the 2nd adjacent position lost-motion vector V1 on each road moved, and the position (the 3rd adjacent position) on each road which approaches there, and accumulation of the dignity according to difference is carried out for every road. Such operation is repeated and the accumulated of dignity pinpoints the position equivalent to the final point 24 on the highest road.

[0029]When the position on a road separates in process of this operation from the error span of the positioning position computed using GPS data, by excepting from the object of matching of that road, the efficiency of processing can be increased and matching accuracy can be raised.

[0030]When the data communications from an emergency call unit stop on the way, In a center, from the final point 24 of drawing 8 (b) expressed with the present position data P2m, Vk is followed conversely, it asks for the point 23, map matching is performed as the vector Vm, Vm-1, --, a position that begins the point 23, and the position on the road equivalent to the final point 24 is pinpointed.

[0031]

[Problem(s) to be Solved by the Invention]In this vehicle emergency reporting system, no matter vehicles may encounter an accident in what state, it is required to enable it to grasp that accident position and accident condition promptly and exactly in the center.

[0032]Since an accident position is pinpointed in the center, transmission of the self-vehicle position data from an accident vehicle is indispensable, but the situation of an accident cannot be grasped only by receiving this data. The information that it is surer for situations -- whether there are any injury people -- to talk over the telephone with a sound using the hand set of an emergency call unit is transmitted. It is difficult for the driver who caused the accident on the other hand in unknown land to give the occurrence position of an accident

exactly quickly. It is an important technical problem for this system to say how the transfer with an accident position and an accident condition is sped up between an accident vehicle and a center under the situation of being urgent.

[0033] Since the electric wave from a GPS Satellite does not arrive when vehicles have passed through the tunnel, effective GPS data cannot be obtained. When an accident occurs in such a situation, in a center. Although map matching must be performed only using the vector data sent from an accident vehicle and an accident position must be pinpointed, since vector data has the character which an error accumulates, it becomes difficult to pinpoint an accident position correctly and promptly in this case.

[0034] The vehicles which caused the accident may change a position after an accident. For example, the vehicles which crashed into the guardrail of the mountain path are cases so that it may fall under a cliff after a while. If a position is pinpointed using the data sent from vehicles immediately after crashing to a guardrail at this time, it will separate from the position of a actual accident vehicle, and such a disagreement may delay rescue of injury people.

[0035] An object of this invention is to provide the vehicles emergency call unit which responds to such a technical problem, and provides the vehicle emergency reporting system which can tell an accident position and an accident condition exactly to a center, and performs the report.

[0036]

[Means for Solving the Problem] Then, data currently recorded on vehicles is divided into two or more blocks at the time of an accident occurrence, and while dividing each block and transmitting to a center, vehicles and a center enable it to talk over the telephone with a sound between transmission of each block in this invention.

[0037] Therefore, in a center, an accident position and an accident condition can be grasped efficiently.

[0038] Vector data to which vehicles under run express with this invention movement of GPS data and vehicles which were acquired from a GPS Satellite is recorded cyclically, While a record stage chooses data of a new prescribed range from data currently recorded at the time of an accident occurrence and transmitting to a center, this range is set up so that one or more effective GPS data may be contained.

[0039] Therefore, in a center which received this data, accuracy of map matching can be raised using effective GPS data.

[0040] When vehicles which caused an accident move further after transmitting data currently recorded to a center, he measures a position after movement and is trying to broadcast the data again to a center in this invention.

[0041] Therefore, a position of the present accident vehicle can be checked in a center.

[0042]

[Embodiment of the Invention] In the vehicle emergency reporting system with which data for the invention of this invention according to claim 1 to pinpoint a vehicle position in the center via a wireless circuit from an accident vehicle at the time of an accident occurrence is transmitted automatically, Vehicles record the data about a vehicle position cyclically during a run, and the data currently recorded is divided into two or more blocks at the time of an accident occurrence, Each block can be divided, it can transmit to a center, the telephone call with a center can be enabled between transmission of each block, and an accident position and an accident condition can be efficiently grasped in a center.

[0043] The invention according to claim 2 transmits this block to a center sequentially from the block containing data with a high priority, and can speed up grasp of the accident position in a center.

[0044] In the vehicles emergency call unit which transmits the data for the invention according to claim 3 being carried in vehicles, and pinpointing a vehicle position via a wireless circuit at the time of an accident occurrence automatically in the center, The data storage means which records the data about a vehicle position cyclically during vehicle running, The data reading means which divides into two or more blocks the data currently recorded on the data storage means at the time of an accident occurrence, and reads it, The control means to which the call means which performs a voice call, transmission of the block read by the data reading means, and the voice call by a call means are made to carry out by turns can be established, and a center can be efficiently told about an accident position and an accident condition.

[0045] A data reading means reads the invention according to claim 4 from the block containing the data in which a record stage is newer than a data storage means previously, and in a center. Since the run history data near an accident position is receivable first, whenever it can grasp a position with an accident position rough for the time being and received data increase in number after that, an accident position can be pinpointed with high precision.

[0046] In the vehicle emergency reporting system with which data for the invention according to claim 5 to pinpoint a vehicle position in the center via a wireless circuit from an accident vehicle at the time of an accident occurrence is transmitted automatically, Vehicles record cyclically the vector data showing movement of the

GPS data and the vehicles which were acquired from the GPS Satellite during a run, While a record stage chooses the data of a new prescribed range from the data currently recorded at the time of an accident occurrence and transmitting to a center, This range is set up so that one or more effective GPS data may be included, and in a center, the accuracy of map matching can be raised using effective GPS data.

[0047]When a transmitted data amount increases by expansion of this range, the invention according to claim 6 compounds the plurality of vector data, controls increase of a transmitted data amount, and can stop the transmitted data amount to a center.

[0048]In the vehicles emergency call unit which transmits the data for the invention according to claim 7 being carried in vehicles, and pinpointing a vehicle position via a wireless circuit at the time of an accident occurrence automatically in the center, The data storage means which records cyclically the vector data showing movement of the GPS data and the vehicles which were acquired from the GPS Satellite during vehicle running, The data reading means which chooses and reads the data of the prescribed range where a record stage is new out of the GPS data and vector data which are recorded on the data storage means at the time of an accident occurrence, The transmitting means which transmits the data read by the data reading means to a center can be established, a data reading means can set up this range so that one or more effective GPS data may be included, and the run history data which always contains effective GPS data can be transmitted to a center.

[0049]A data reading means compounds the plurality of vector data, and the invention according to claim 8 aims at reduction of a transmitted data amount, and can suppress increase of the transmitted data amount to a center.

[0050]In the vehicle emergency reporting system with which data for the invention according to claim 9 to pinpoint a vehicle position in the center via a wireless circuit from an accident vehicle at the time of an accident occurrence is transmitted automatically, When it detects that vehicles transmitted to the center the data which records the data about a vehicle position cyclically and is recorded during the run at the time of an accident occurrence, and moved further after this transmission, The data which pinpoints the position after movement is broadcast again to a center, and the position of the present accident vehicle can be checked in a center.

[0051]Hereafter, an embodiment of the invention is described using a drawing.

[0052](A 1st embodiment) A 1st embodiment explains the vehicle emergency reporting system which carries out efficiently the data communications of run history data, and the telephone call with a sound.

[0053]The vehicles emergency call unit of this system and the hard structure of a center are the same as drawing 6. The vehicles emergency call unit is provided with the composition shown in drawing 1 as a block for performing data communications and a telephone call. In this composition, the hand set 61 which performs a voice call, and the control switching part 44 which performs the change to a voice call from data communications are further added to the composition of drawing 7.

[0054]In this vehicles emergency call unit, at the time of a run, to the ring buffer 13 GPS data (G), Vector data (V) and present position data (P) are recorded cyclically, and the data transmitted to a center is read to the field 20 for send data by the send data reading section 16 at the time of an accident occurrence. The operation so far is the same as what was explained by drawing 7.

[0055]Next, the control section 14 directs to output the data of the 1st block to the send data reading section 16 among the data transmitted to a center. The send data reading section 16 which received this outputs the newest present position data shown as "1" by drawing 2, the GPS data for 20 data with a new record stage, and vector data (P2m, Gm, Vm, --, Gm-19, Vm-19) to the transmission section 17. The transmission section 17 transmits this to a center using the antenna 18.

[0056]Next, the control section 14 points to the change to a voice call to the control switching part 44, and the control switching part 44 enables the telephone call which uses the hand set 61.

[0057]If predetermined time passes, while the control section 14 directs the stop of a voice call to the control switching part 44, it directs the 2nd output of the data of a block to the send data reading section 16. In response, drawing 2 shows the send data reading section 16 as "3." A record stage outputs the GPS data and vector data (Gm-20, Vm-20, --, Gm-39, Vm-39) for 20 data new next to the transmission section 17, and the transmission section 17 transmits this to a center using the antenna 18.

[0058]Next, the control section 14 points to the change to a voice call to the control switching part 44, and the control switching part 44 enables the telephone call which uses the hand set 61.

[0059]Thus, in this vehicles emergency call unit, the run history data transmitted to a center is divided into two or more blocks, and the data communications and the voice call of those blocks are performed by turns. About run history data, the data arranged in the transmission order to a center is divided into plurality, and a record stage transmits sequentially from the high block of the block containing new data to a priority.

[0060]On the other hand, in a center, if the block of the 1st of run history data is received, the vector Vm, --, the position that follows Vm-19 conversely and begins it are searched for from the position expressed with P2m,



and map matching will be started from there and it will ask for the final position on a road in coarse accuracy.

[0061]Next, if the time zone of a telephone call comes, by telephone call, an operator will ask an accident condition and will check injury people's existence, etc.

[0062]Next, if the block of the 2nd of run history data is received, the data will be used together with the data of the 1st block, map matching will be carried out, accuracy will be raised, and it will ask for the final position.

[0063]If the time zone of the next telephone call comes, an operator will check the damage condition of vehicles by telephone call.

[0064]Thus, in a center, whenever it receives the block of run history data, it asks for an accident position by map matching. Whenever the reception times of this block increase and the number of the data which can be used increases, pinpointing of an accident position is attained in higher accuracy. In the time zone of a telephone call, injury people's existence, etc. check an accident condition from the high matter of urgency.

[0065]An emergency vehicle is made to go in the accident position direction in a center in the stage which the rough accident position understood and injury people's generating understood. Then, if high-precision accident position information is acquired, the emergency vehicle under run will be told about a final destination.

[0066]In this vehicle emergency reporting system, a prompt action can be flexibly taken according to an accident condition by such a method.

[0067](A 2nd embodiment) A 2nd embodiment explains the data communications of run history data when an accident occurs at places where GPS data are not obtained, such as a tunnel.

[0068]In the vehicles emergency call unit of this system, as shown in drawing 3 (a), the ring buffer 13 is provided with the storage region which can store more data than the run history data transmitted to a center. In drawing 3 (a), the dotted line shows the field where the data transmitted to a center is usually stored. Only the data of a predetermined number with a new record stage is transmitted to a center in the data currently recorded on the ring buffer 13.

[0069]If an accident occurs, as shown in drawing 3 (b), the send data reading section 16, The present position data (P2n) of the newest out of the field where the data of the transmission object is stored, GPS data and vector data (Gn, Vn, --, Gk, Vk) which are contained to the field, The present position data (P2k-1) of the last of the field is read to the field 20 for send data, and these data is outputted to the transmission section 17 in order ofn [ P2 ], Gn, Vn, --, Gk, Vk, and P2k-1. The transmission section 17 transmits these data to this order in the center.

[0070]However, since the reception radio wave from a GPS Satellite does not arrive while vehicles are running the tunnel, effective GPS data cannot be obtained. At this time, from the GPS treating part 11 of an emergency call unit, the GPS data which attached the flag which shows invalidity are outputted at the output stage of GPS data, and this is recorded on the ring buffer 13 at it. As shown in (c), "\*" is attached and invalid GPS data are expressed with drawing 3.

[0071]When the effective GPS data in the run history data which a center receives at the time of an accident occurrence are not contained, Since the processing which judges the propriety cannot carry out the candidate position on a road in process of map matching as compared with an absolute position, high-precision map matching cannot be performed.

[0072]Then, in such a case, the send data reading section 16 extends the object domain of the ring buffer 13 which reads the data transmitted to a center to the range in which one or more effective GPS data are contained, as shown in drawing 3 (c). And the newest present position data (P2n) in the field expanded as shown in drawing 3 (d), The vector data (Vn, --, V2) contained to the field, effective GPS data (G1), and the present position data (P3) of the last of the field are read to the field 20 for send data, and a record stage transmits them to a center sequentially from new data.

[0073]Drawing 4 shows this pattern typically. Vehicles until it advances into a tunnel record V0, V1, and V2 as vector data, and are recording G0 [ effective ] as GPS data, G1, and G2. After advancing into a tunnel, V3, --, Vk, --, Vn-1, and Vn are recorded as vector data, and G3\*, --, Gk\*, --, Gn-1\*, and Gn\* are recorded as GPS data, but each of these GPS data is invalid data.

[0074]Suppose that the accident occurred on vehicles in this state. If it is in the state where normal GPS data are obtained, the vector data from Vk to Vn and the GPS data from Gk to Gn will be transmitted to a center, but. Now, since all the GPS data from Gk to Gn are invalidity, the range of send data is extended to the place where effective GPS data are contained, and the vector data from V1 to Vn and the effective GPS data of G1 and G2 are transmitted to a center.

[0075]the range of send data -- it seems to be large -- when it can fold and a transmitted data amount increases too much, by compounding the continuous vector data which the direction approximates and considering it as one vector, data volume is reduced and a transmitted data amount is stored within the limits of predetermined.



[0076]Thus, by certainly including one or more effective GPS data into the run history data transmitted to a center, in the center, execution of exact map matching is attained and an accident position can be grasped correctly.

[0077](A 3rd embodiment) A 3rd embodiment explains transmission of data when an accident vehicle moves further from an accident position.

[0078]By drawing 5, after the vehicles 91 which caused the accident perform the data communications of the 1st run history data to a center at the road shoulder of the mountain path 93, the case where it falls along the slant face of a mountain is shown. The control section 14 (drawing 1) of the emergency call unit of these vehicles 92 directs generation of GPS data to the GPS treating part 11, if movement of the body after data communications is identified based on the detection result of the accident detection part 15 which comprises a sideslip sensor etc.

[0079]In response to these directions, the GPS treating part 11 processes the input signal from a GPS Satellite, and outputs lat/long data to the ring buffer 13.

[0080]The control section 14 points to read-out of the data from the ring buffer 13 to the send data reading section 16, and the send data reading section 16 reads the run history data containing the newly added GPS data from the ring buffer 13, and it outputs it to the transmission section 17. The transmission section 17 transmits this data to a center.

[0081]In this way, the 2nd data communications are performed from the vehicles 92 which moved from the first accident position. In a center, the data received by these 2nd data communications can be analyzed, and the road 94 nearest to the position of the accident vehicle 92 can be detected.

[0082]

[Effect of the Invention]So that clearly from the above explanation in the system of this invention. Since run history data is divided into a block, it transmits to a center and vehicles and a center enable it to talk over the telephone with a sound in the intervals of transmission of each block, in a center. An accident position and an accident condition can be grasped efficiently and it can lecture on the suitable measure according to an accident condition promptly.

[0083]In the system of this invention, in order to certainly contain effective GPS data in the run history data sent to a center from vehicles, in a center, an accident position is detectable with high precision.

[0084]Since a center retransmits a message to the position data after movement when the accident vehicle moves further in the system of this invention after transmitting data to the center, the current position of an accident vehicle can be grasped in a center.